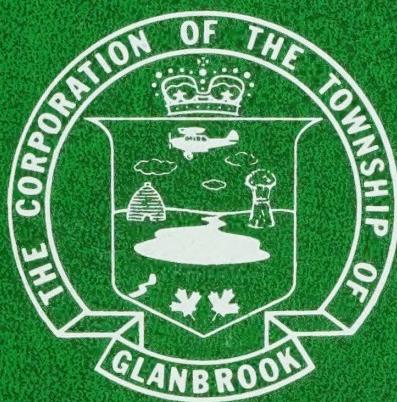


CAYONGENBAOS
81R55

G THE TOWNSHIP OF GLANBROOK



1981 ROAD

NEEDS STUDY



Technical Co-ordinating Committee

D. W. Weylie	Mayor (Chairman)
R. Johnston	Councillor
H. Brown	Councillor
C. Switzer	Clerk
R. Ferguson	Road Superintendent
H. Patterson	Hamilton-Wentworth Region
G. Freeman	Representative, Ministry of Transportation and Communications
B. Nemethy	Representative, Ministry of Transportation and Communications
McCormick, Rankin & Associates Limited	Consultant to the Committee



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Chapter 1

Introduction

PURPOSE

The purpose of undertaking a Road Needs Study is to provide the Ministry with sufficient information to develop a subsidy allocation program based on the condition of the existing road system. This information is obtained through the process of:

1. Ascertaining the municipality's present road system for inventory purposes,
2. Inventorying those roads, structures and railway crossings making up the road system,
3. Identifying any deficiencies, estimating the cost of removing those deficiencies and providing the municipality with a system which will assist them in scheduling road improvements,
4. Examining the municipality's maintenance recording system and provide them with a financial summary of their road department's maintenance costs.

BACKGROUND

Early in 1975, the Ministry of Transportation and Communications initiated a program which is aimed at the development of a system to distribute available provincial funds to the larger spending, lower tier municipalities. A system similar to this has been operating successfully for a number of years with the Counties and Regions. The program is based on a consistent method of measuring construction needs and evaluating maintenance operation expenditures. It was felt that such a system was necessary, as provincial funds for road subsidies to municipalities are limited and in recent years municipal requests for these funds have been exceeding the Ministry's Municipal Road Budget.

STUDY METHODS

The procedures used to carry out this study are explained in detail in the following manuals published by the Ministry of Transportation and Communications:

- (a) Methods Manual
Municipal Road Systems
Needs Measurements 1978
- (b) Inventory Manual
Municipal Roads and Structures 1978

These manuals are available in the Township offices for further inspection of the Study Methods.

Basically, the study was divided into the following categories:

- (1) Traffic - determine present and estimate 10 year traffic volumes,
- (2) Inventory of the existing road system along with related structures and railway crossings,
- (3) Estimation of Construction Needs,
- (4) Examination of Past Maintenance Costs,
- (5) Review of Equipment Inventory and Needs, and
- (6) Preparation of a report.

A discussion of the first five categories is included in the ensuing chapters.

Chapter 2

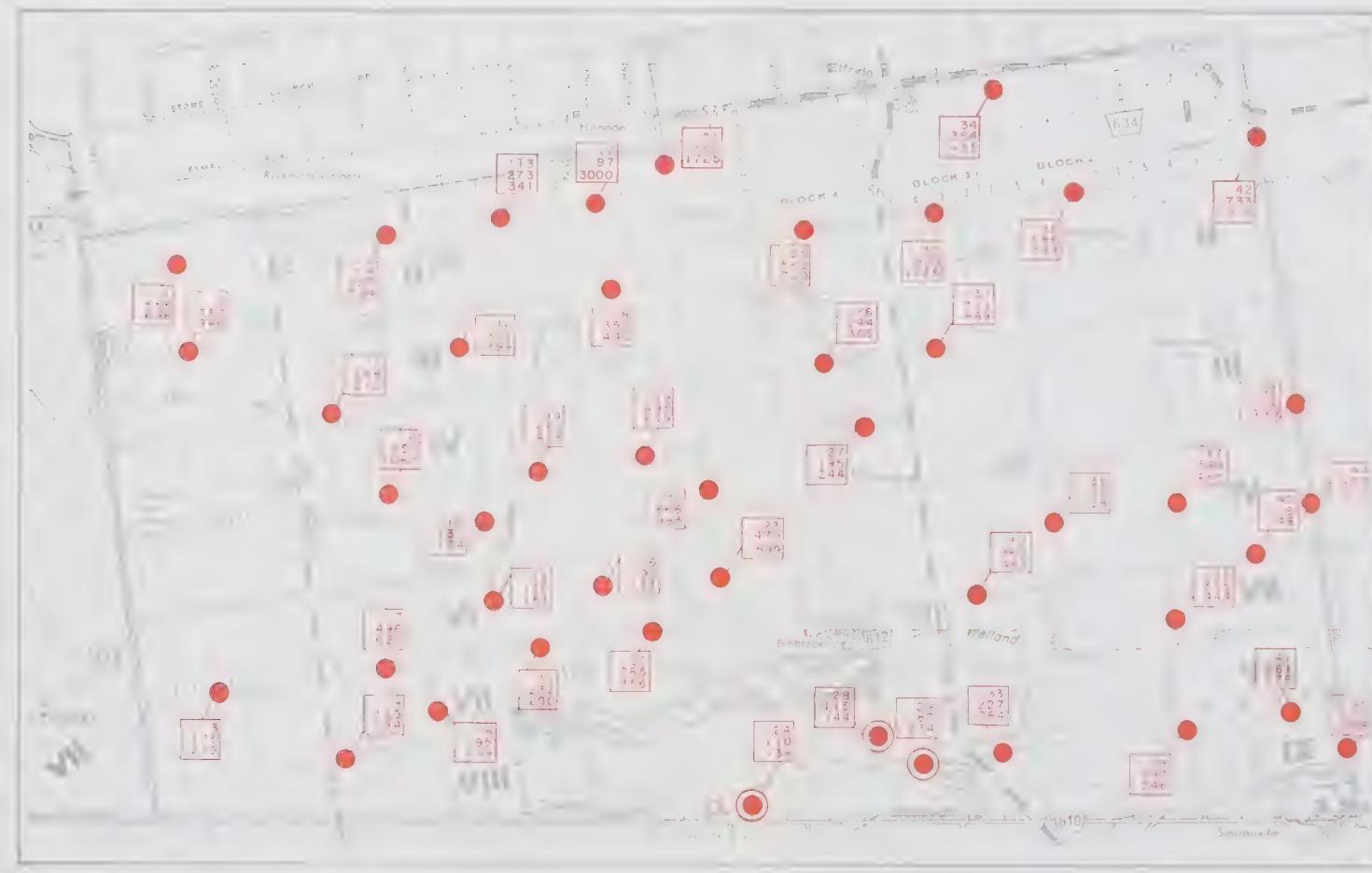
Traffic

GENERAL

A good measure of the relative importance of any particular road section, within the overall system is the number of vehicles using that road daily. Using these traffic volumes, it is possible to compare the existing condition of a road with the appropriate minimum tolerable standard set by the Ministry of Transportation and Communications for the various design classes.

A total of 45 automatic traffic counts were taken by the Region for the Township during the week of June 18 to June 25. Of the 45 counts, 42 were 24 hour counts with the remaining being 3 day counts over a weekend. These 3 day counts were taken in the vicinity of the Binbrook Conservation Area. A 10 year traffic growth factor of 1.25 was agreed to by the Committee for study purposes. This growth factor was developed by taking into consideration the 10 year growth factors being used by the Region and the adjacent municipalities. For the roads that will be serving the proposed industrial park (Glover and Twenty Roads) 10 year traffic volumes were developed based on the proposed development.

The traffic data map, Map 1, page 4 indicates the 1981 and estimated 1991 A.A.D.T., (Average Annual Daily Traffic), on the Township road in the area where the traffic count was taken. This information was used during the inventory to determine the appropriate appraisal standards for each road section, structure and railway crossing.



TRAFFIC DATA MAP

LEGEND

COUNT LOCATION & NUMBER
1981 AADT
1991 AADT

卷之三十一

MAP I, PAGE 4

**Township of
GLANBROOK**

Chapter 3

Road System

GENERAL

The road system construction needs indicate the total dollar expenditure required to improve that portion of the existing road system which did not meet the Ministry's minimum tolerable standards. These construction needs are determined by an inventory which indicates:

- (1) the type and location of all deficiencies,
- (2) the time periods in which the deficiencies are expected to occur, and
- (3) an estimate of the cost required to eliminate the deficiencies based on the Township's desirable standards.

INVENTORY

An inventory was taken of all roads, structures and railway crossings presently under the jurisdiction of the Township. The Ministry's new manual indicates that all rural roads and major urban roads are to be inventoried in detail. The remaining semi-urban sections are to be inventoried using the modified appraisal method which only records certain features of the existing road such as the road section's name and location, the length of the section, the existing class, the structural rating, and an indication of the type, cost and time of any improvements necessary. The number of road sections was kept to a minimum with consideration to physical characteristics and conditions of the roads.

The resulting road inventory sections are shown on Map 2, page 7. Similarly, the structure and railway crossing locations are shown on Map 3, page 8.

A summary of the road system in kilometres by surface type was recorded from the statistical data recorded during the road inventory. This summary, page 6, indicates a total of 166.4 km of road are presently under the Township's jurisdiction. Included in this overall total are 31.1 km of Boundary Roads.

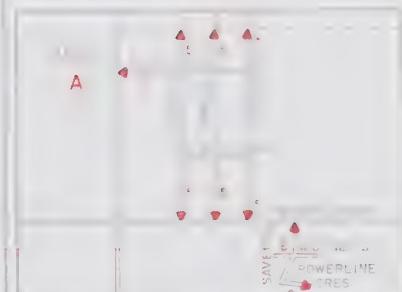
ROAD SYSTEM IN KILOMETRES 1981

SURFACE TYPE	LENGTH IN KILOMETRES
EARTH	1.0
GRAVEL - STONE	73.3
LOW CLASS BITUMINOUS	90.1
INTERMEDIATE CLASS BITUMINOUS	1.0
HIGH CLASS BITUMINOUS	1.0
CONCRETE	—
ASPHALT ON CONCRETE	—
OTHER	—
NEW ROAD	—
SUB - TOTAL	166.4
LESS ADJACENT MUNICIPALITY'S SHARE OF BDY. ROADS $31.1 \div 2 = 15.5$	15.5
TOTAL	150.9

ROAD SECTION MAP

LEGEND

ROAD SECTION



MAP 2, PAGE 7

Township of
GLANBROOK

REGIONAL BOUNDARY

LOCAL ROADS

PROVINCIAL HIGHWAYS

FORESTS

STRUCTURE & RAILWAY CROSSING LOCATION MAP

LEGEND

STRUCTURES
RAILWAY CROSSINGS



AREA
ABERFELDY

MAP 3, PAGE 8

Township of
GLANBROOK

Chapter 4

Construction Needs

DEFICIENCIES

Road Sections

All road sections that are classified as being inadequate are deficient for one or more of the following reasons:

- (1) Surface Type - substandard surface type dependent upon traffic volume or road classification.
- (2) Surface Width - inadequate width of driving surface excluding shoulders, depending on traffic volume or road classification.
- (3) Average Safe Speed - inability to maintain a reasonably safe speed.
- (4) Level of Service - inability of the road to accommodate the traffic.
- (5) Structural Adequacy - inability of the road base to support vehicles.
- (6) Drainage - where road sections experience flooding at least once per year.

Note: Items 1 to 6 inclusive apply to roads inventoried in detail. Only items 1, 5 and 6 apply to roads inventoried with the modified appraisal.

Structures

Bridges (i.e. those structures of 6.0 m span and greater), may be classified as being inadequate if they are deficient for one or more of the following reasons:

- (1) Safe Loading - inability to carry loads of at least 10 tonnes.
- (2) Roadway Width - inadequate width of driving surface on the structure.
- (3) Vertical Clearance - inadequate height from road to overhead obstruction.
- (4) Level of Service - inability of the structure to accommodate traffic.
- (5) Sidewalks - inadequate provision made for pedestrian traffic in urban areas.
- (6) Opening Adequacy - inadequacy of the span to accommodate normal water flow or traffic in the case of grade separations.

Railway Crossings

Railway crossings are classified as being deficient for one or more of the following reasons:

- (1) Visibility - insufficient train to vehicular sight distance at level crossing.
- (2) Exposure Index - the exposure index, defined as being the product of the number of trains per day and the A.A.D.T. (Average Annual Daily Traffic), exceeds the limits specified in the inventory manual for the existing protection. These limits are as follows:

Exposure Index	Type of Protection
0 - 3,500	Advance Warning Signs
3,500 - 75,000	Automatic Signals
75,000 + rural	Grade Separate (where possible)
150,000 + urban	Grade Separate (where possible)

A complete listing of all railway crossings is included in the appendix of this report.

TYPE OF IMPROVEMENTS

As stated in the inventory manual, only three types of improvements have been costed for the deficient roads and structures. These improvements are:

- (1) Spot - improvements to roads which eliminate isolated deficiencies.
- (2) Tolerable - nominal base or widening improvements for deficient rural roads carrying less than 200 vehicles per day.
- (3) Design - improvements of roads to the municipality's standard.

Maps have been included at the end of this chapter showing the location of the road sections, structures and railway crossings and the construction requirements for the Township's existing road network.

TIME AND COST OF IMPROVEMENTS

Using 1979 unit prices and typical cross sections approved by the Technical Co-ordinating Committee, "Bench Mark Construction Costs" were calculated. These costs, included in the Appendix of this report, were used to determine the Township's total theoretical needs which are summarized on pages B.1-3.

These needs are divided into the Now, 1-5 and the 6-10 Year periods. The time period that a deficient road falls into is determined by the criteria outlined in the inventory manual and based on the condition of the facility at the time of the appraisal. The Now period being a backlog of construction needs for deficient roads and the 1-5 and 6-10 Year periods being ranges in which future deficiencies are expected to occur.

For the ten year study period the Township's needs are estimated to be \$6,073,000.00. Based on existing Ministry subsidy arrangements, the Township's share of the local road construction needs is approximately \$3,037,000.00.

MUNICIPAL ASSISTANCE PROGRAM

From the foregoing and the results from Road Needs Studies in other municipalities, the Ministry of Transportation and Communications has sufficient information available which has permitted the introduction of an allocation program based on "Needs" and "Available Funds".

PRIORITY RATINGS AND PRIORITY GUIDE NUMBERS

Priority Rating

The Ministry of Transportation and Communications has developed a mathematical empirical formula which attaches a priority to each deficient road section or structure. The Priority Rating is based on both condition and usage of the facility. The larger the Priority Rating number, the greater the need for improvement. Priority Ratings, however, do not take into consideration the cost of improvement and as a result it is desirable to calculate a Priority Guide number.

Priority Guide

The Priority Guide number takes into consideration the condition of the road, the traffic using the facility during the study period and the estimated cost to remove the deficiency. This is accomplished by using the formula

$$\begin{aligned} \text{Priority Guide} &= \frac{100 \text{ Minus Condition Rating}}{\text{Total cost/vehicle miles}} \\ &= \frac{100 \text{ Minus Condition Rating}}{\text{Cost/vehicle mile}} \end{aligned}$$

$$\begin{aligned} *\text{Vehicle miles} &= \text{section length} \times \text{average daily} \\ &\quad \text{study period traffic} \times 365 \text{ days} \\ &\quad \text{in a year} \times \text{estimated years of} \\ &\quad \text{life of reconstructed facility} \end{aligned}$$

The larger the Priority Guide number, the greater is the cost benefit of improvement. Consequently, if improvements are made to two similar sections with the same Priority Rating number but different Priority Guide numbers, the greatest benefit, for the dollar expended, will be realized by the section with the higher Priority Guide.

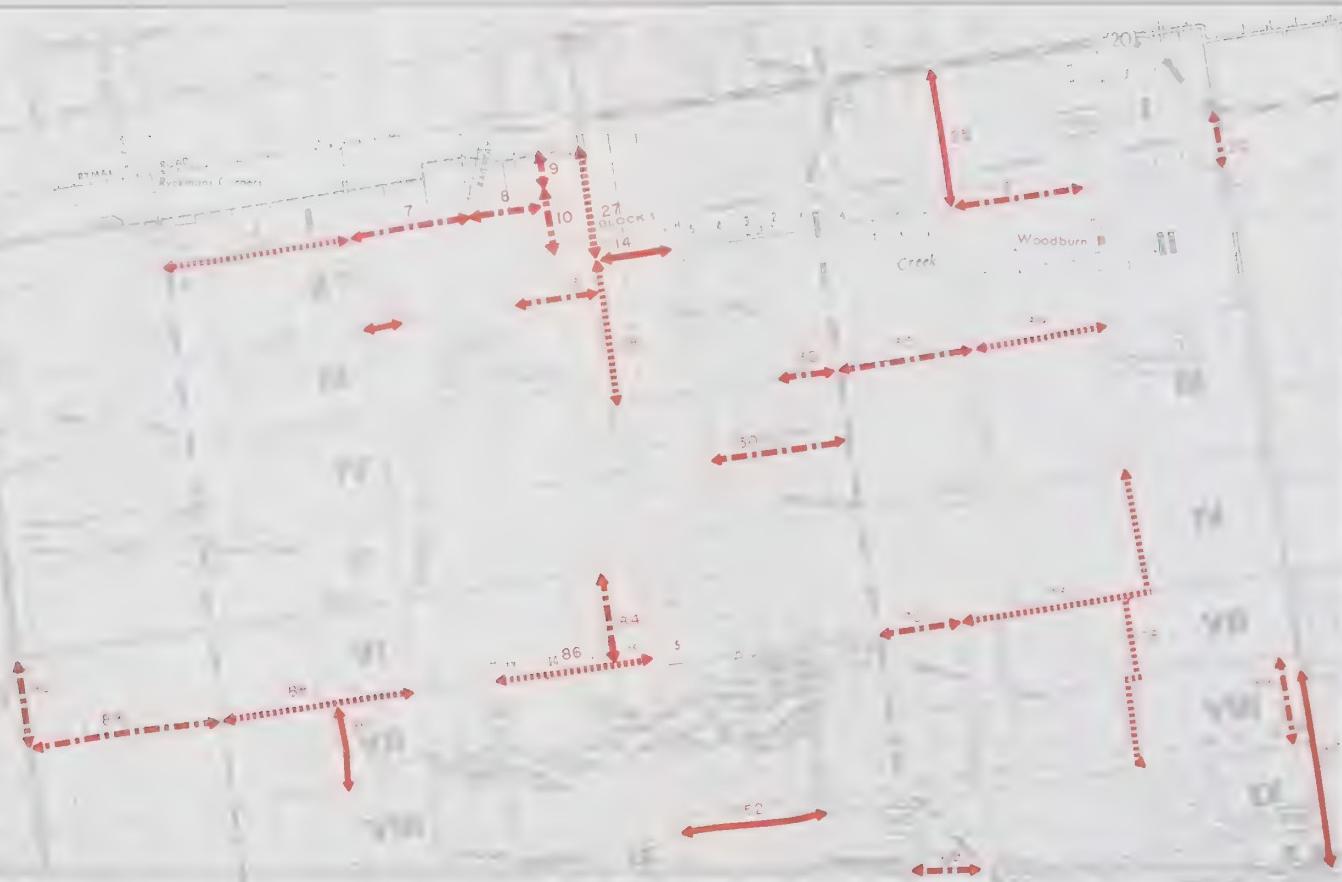
A priority for all other deficient roads has been developed using "100 minus the Condition Rating". As with the Priority Rating and the Priority Guide Number, the larger the number, the greater the need.

In order to assist the Township in making preliminary selections of future construction programs, a complete listing of all deficient road sections by road classification, time periods, and priority has been included in the Appendix of this report.

AS THE NEEDS SUMMARIZED HEREIN DO NOT TAKE INTO CONSIDERATION SUCH FACTORS AS PROJECT CONTINUITY, ENVIRONMENTAL IMPACT, DISTRIBUTION OF WORK WITHIN THE MUNICIPALITY, AVAILABILITY OF CONSTRUCTION FUNDS, ETC., THE TOWNSHIP'S ACTUAL RECONSTRUCTION PROGRAM MAY DIFFER FROM THE FINDINGS OF THIS REPORT.

COST SHARING OF TOTAL CONSTRUCTION NEEDS
 (THOUSANDS OF DOLLARS)
 (AS OF JAN. 1, 1981)

TIME PERIODS	NOW		1-5 YEARS		NOW + 1-5 YEARS		6-10 YEARS		NOW + 1-10 YEARS	
COST SHARING ARRANGEMENTS	MUN'S SHARE	M.T.C.'S SHARE	MUN'S TOTAL SHARE	M.T.C.'S TOTAL SHARE						
• RURAL	225	225	450	1227	2454	1452	2904	1365	1366	2731
• SEMI-URBAN	—	—	—	—	—	—	—	—	—	—
• SPOT IMPROVEMENTS	162	161	323	—	—	162	323	—	—	162
- RURAL	40	39	79	—	—	40	39	79	—	40
- SEMI-URBAN	14	15	29	—	—	14	15	29	—	14
• BRIDGES	10	9	19	—	—	10	9	19	—	10
• RAILWAY CROSSINGS	450	450	900	1227	2454	1677	1677	3354	1365	2731
TOTAL										



CONSTRUCTION REQUIREMENTS MAP

LEGEND

NOW DEFICIENT		25
PARTIALLY DEFICIENT		20
DEFICIENT		27

ALDERLEA

SHALDING

MAP 4 , PAGE 14

Township of
GLANBROOK

Chapter 5

Fixed Costs

MAINTENANCE

Maintenance expenditures for 1979 and 1980 were reviewed and have been summarized on page 15 in accordance with the Ministry's form MRA 36. The total subsidizable maintenance expenditures, including overhead was \$386,061.00 in 1979 and \$499,124.00 in 1980.

EQUIPMENT REPLACEMENT COSTS

A list of the major pieces of equipment operated by the Township's Road Department was prepared and is shown on page 16. This "Equipment Inventory and Theoretical Needs" table describes each piece of equipment and gives the approximate cost (based on 1981 unit prices) and the replacement year for each. This table indicates a theoretical schedule with the actual equipment replacement being determined each year by council.

MAINTENANCE EXPENDITURES

CATEGORIES & ACTIVITIES		1979	1980	1981	1982	1983	1984	1985
BRIDGES & CULVERTS								
A	Bridges & Culverts	4851	5482					
ROADSIDE MAINTENANCE								
B-1	Gross Mowing & Weed Spraying	9278	7198					
B-2	Brushing ,Tree Trimming & Removal	8270	23220					
B-3	Ditching	23550	19950					
B-4	Catch Basins , Curb & Gutter Cleaning Storm Sewers	17720	25891					
B-5	Debris & Litter Pick-up	2218	4628					
B	Total Roadside Maintenance	61036	80887					
HARD TOP MAINTENANCE								
C-1	Patching & Spray Patching	28792	35468					
C-2	Sweeping , Flushing , Cleaning	178	2227					
C-3	Shoulder Maintenance - Grading Patching , Washouts , Dust Layer	2280	496					
C-4	Resurfacing	62943	91060					
C	Total Hard Top Maintenance	94193	129251					
LOOSE TOP MAINTENANCE								
D-1	Patching & Washouts	311	363					
D-2	Grading & Scarifying	15718	14322					
D-3	Dust Layer	21124	27248					
D-4	Prime or Priming	47938	60451					
D-5	Gravel Resurfacing	71648	115526					
D	Total Loose Top Maintenance	156739	217910					
WINTER CONTROL								
E-1	Snow Plowing & Removal	26225	15087					
E-2	Sanding & Salting	29698	32318					
E-3	Snow Fence , Culvert Thawing Etc.	2984	4237					
E-4	Winter Standby	—	—					
E	Total Winter Control	58907	51642					
SAFETY DEVICES								
F	Safety Devices , Signs , Guide Rails, Railroad Maintenance	10335	13952					
MISCELLANEOUS								
G	Total Miscellaneous							
TOTAL		386061	499124					

EQUIPMENT INVENTORY AND NEEDS
(BASED ON MARCH 1981 COSTS)

ITEM	MACHINE NUMBER	YEAR PURCHASED	TENTATIVE REPLACEMENT & COST (In Thousands of Dollars)								
			1981	1982	1983	1984	1985	1986	1987	1988	1989
Chev. Pickup Cust. Del. 10	501	1978	-	-	8	-	-	-	-	-	-
Int. R200 2050A	502	1978	-	-	-	-	-	50	-	-	-
Dodge D800	503	1974	-	50	-	-	-	-	-	-	-
John Deere 770 Grader JD 770	504	1976	-	-	-	-	-	-	-	120	-
Case Backhoe 680E	505	1976	-	-	-	-	-	-	-	-	50
Dodge D800	506	1971	NOT TO BE REPLACED								
John Deere 310 Tract & Mower	507	1973	-	-	-	-	-	-	16	-	-
Dodge Van Sportsman	508	1966	-	-	10	-	-	-	-	-	-
Int. S. Series DT 466	509	1980	-	-	-	-	-	-	50	-	-
John Deere 310 A	512	1981	24	-	-	-	-	-	-	-	-
Distributor TB1307	514	1956	BEYOND STUDY								
Int. S. Series DT 466	516	1976	48	-	-	-	-	-	-	-	-
Int. 1020 2010 A	518	1976	-	-	-	-	-	50	-	-	-
Dominion Grader D562	519	1970	-	-	120	-	-	-	-	-	-
Buffalo Spring Roller KT19A8	520	-----	BEYOND STUDY								
Miscellaneous			3	3	3	3	3	3	3	3	3
TOTAL			75	53	133	11	53	53	19	123	53

Chapter 6

Annual Update

It is desirable that this study be kept current by the municipality. This is accomplished by undertaking an annual review under the following headings:

- (1) Construction - elimination of the construction needs for those sections where improvements have been undertaken since the last review.
- (2) Structural Adequacy - check for any structural failures that have occurred.
- (3) Maintenance - make adjustments for any changes in maintenance practices or exceptional cost increases.
- (4) Structures - review bridges for structural deterioration.
- (5) System Changes - revise deficiency listings and update inventory sheets as changes in the Road System take place.

Updating procedures are detailed in the Methods Manual "Municipal Road Systems, Needs Measurements". Additional information or clarification can be obtained from the Ministry of Transportation and Communications.

Appendices

Appendix A

Geometric Standards

GEOMETRIC STANDARDS

IMPERIAL

METRIC

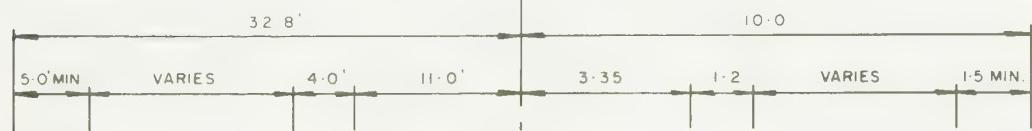


0 - 400 V.P.D. RURAL

GRAVEL SURFACE

4" GRANULAR 'A', 6" GRANULAR 'B'

101 mm GRANULAR 'A', 152 mm GRANULAR 'B'



400 - 1000 V.P.D. RURAL

DOUBLE SURFACE TREATMENT

6" GRANULAR 'A', 10" GRANULAR 'B'

152 mm GRANULAR 'A', 254 mm GRANULAR 'B'



1000 - 3000 V.P.D. RURAL

BITUMINOUS PAVEMENT

2" HOT MIX FOR 1000 - 2000, 2.5" HOT MIX FOR 2000 - 3000
6" GRANULAR 'A', 12" GRANULAR 'B'

51mm HOT MIX FOR 1000 - 2000, 63mm HOT MIX 2000 - 3000
152 mm GRANULAR 'A', 305 mm GRANULAR 'B'



3000 + V.P.D. RURAL

BITUMINOUS PAVEMENT

3" HOT MIX, 6" GRANULAR 'A', 12" GRANULAR 'B'

76mm HOT MIX, 152 mm GRANULAR 'A', 305 mm GRANULAR 'B'



SEMI - URBAN

BITUMINOUS PAVEMENT

3" HOT MIX, 6" GRANULAR 'A', 12" GRANULAR 'B'

76mm HOT MIX, 152mm GRANULAR 'A', 305 mm GRANULAR 'B'



URBAN LOCAL RESIDENTIAL

BITUMINOUS PAVEMENT

3" HOT MIX, 6" GRANULAR 'A', 12" GRANULAR 'B'

76mm HOT MIX, 152mm GRANULAR 'A', 305 mm GRANULAR 'B'

Appendix B

Bench Mark Costs

URBAN ROAD CONSTRUCTION

(COST IN THOUSANDS OF DOLLARS PER KILOMETRE)

ARTERIAL

Nº OF LANES	BASE & SURF. (MINOR)	BASE & SURF. (MAJOR)	RESURF. & WIDEN (MINOR)	RESURF. & WIDEN (MAJOR)	RECONST. SEMI-URB. ST'D	RECONST. URB. ST'D NOMIN. SS.*	RECONST. URB. ST'D INCLUD. SS.	ST. SEWER & ROAD REINSTAT.
2								
3								
4								
5								
6								
7								

COLLECTOR

Nº OF LANES	BASE & SURF. (MINOR)	BASE & SURF. (MAJOR)	RESURF. & WIDEN (MINOR)	RESURF. & WIDEN (MAJOR)	RECONST. SEMI-URB. ST'D	RECONST. URB. ST'D NOMIN. SS.*	RECONST. URB. ST'D INCLUD. SS.	ST. SEWER CONST. & RD. REINSTAT.
2	R.							
	I.C.							
3	R.							
	I.C.							
4	R.							
	I.C.							

LOCAL

Nº OF LANES	BASE & SURF. (MINOR)	BASE & SURF. (MAJOR)	RESURF. & WIDEN (MINOR)	RESURF. & WIDEN (MAJOR)	RECONST. SEMI-URB. ST'D	RECONST. URB. ST'D NOMIN. SS.*	RECONST. URB. ST'D INCLUD. SS.	S.S. CONST. & ROAD REINSTAT.	
2	R.	41	107			190	233	372	178
	I.C.		128				280	401	180

* NOMINAL STORM SEWER COSTS INCLUDE :

- REPLACEMENT OR RELOCATION OF MANHOLES AND CATCH BASINS AS REQUIRED
- EXTENSION OF LATERALS
- ADJUSTMENTS TO MANHOLE AND CATCH BASIN COVERS.

RURAL ROAD CONSTRUCTION (Cost in thousands of dollars per kilometre)

Contract Prices

DESIGN STANDARD	Design Year AADT	Type of Construction	Average Cost Per Kilometre		
			Flat	Rolling	Rocky
Min.	50-	Base & Surface (Grav. Only)	35	40	
Tol.	200	Resurf. & Widen (Grav. Only)	29	34	
	200	Base & Surface	46	51	
	-	Resurf. & Widen	42	47	
	400	Reconstruction	96	105	
	400	Base & Surface	55	60	
	-	Resurf. & Widen	45	50	
	1000	Reconstruction	109	129	
	1000	Base & Surface	80	85	
	-	Resurf. & Widen	55	65	
	3000	Reconstruction	158	180	
Over 3000		Base & Surface			
2 Lanes		Resurf. & Widen			
		Reconstruction			
		Base & Surface			
4 Lanes		Major Resurf. & Widen			
		Reconstruction			

NEW STRUCTURES (AVERAGE COST PER SQUARE METRE OF DECK AREA)

Proposed Structure	Soil Conditions		
	Good	Fair	Poor
Single Span	670 / 570	700 / 600	800 / 700
Multi Span	615 / 450	665 / 500	755 / 590

WITH/WITHOUT
EPOXY COATED STEEL

RESURFACING (Cost in Thousands of Dollars Per Kilometre)

RURAL

Road Width in Metres	Upper Tier Only			Double Lift Hot Mix*
	Single Surf. Treatment	Double Surf. Treatment	Single Lift Hot Mix*	
5.5 - 6.0				
6.1 - 6.5				
6.6 - 7.0			8.0	22.0
10.0 - 11.0				40.0
13.0 - 15.0				

* Includes Shouldering

URBAN

Road Width in Metres(Lanes)	Upper Tier Only Single Lift Hot Mix**	Double Lift Hot Mix**
6.0 - 7.0 (2 ln)	24.0	41.0
7.1 - 9.0 (2 ln)	28.0	49.0
10.0 - 12.0(3 ln)		
13.0 - 15.0(4 ln)		
19.0 (5 ln)		
22.0 (6 ln)		
26.0 (7 ln)		

** Cost Includes Catch Basin and Manhole Adjustments and up to 15% Padding

UNIT PRICE COSTS

Granular "A" /tonne	<u>4.35</u>	Catch Basin (Each)	<u>800.00</u>
Granular "B" or "C"/tonne	<u>4.35</u>	Manhole (Each)	<u>1,600.00</u>
Hot Mix /tonne (H. L. 4)	<u>26.00</u>	Catch Basin/Manhole Removal (Each)	<u>200.00</u>
Storm Sewer (525 mm Dia.)/metre	<u>112.00</u>	Earth Excavation/Cubic metre	<u>2.90</u>
Curb & Gutter/metre	<u>25.00</u>	Curb & Gutter Removal/metres	<u>5.00</u>
Sidewalk/Square Metre	<u>20.00</u>		

Appendix C

Deficiency Listings

NOW SPOT DEFICIENCIES

ROAD CONSTRUCTION NEEDS BY TIME PERIODS

PRIORITY	TYPE OF DEFICIENCY	SECTION NUMBER	NAME / LOCATION	DESCRIPTION	IMPROV. LENGTH (in km.)	TOTAL COST (THOUS.)	TYPE OF IMPROV.
RATING	GUIDE			FROM	TO		
-	- structural	5	Aldercrest Survey	Con. 1, Lot 6	2.4	58	B & S
-	- structural	6	0.5 km East of Hwy. 6	Con. 2, Lot 7	0.2	21	B & S
-	- structural	21	West-Lincoln Townline Road	Golf Club Rd.	0.1	5*	Surface
-	- structural	24	Hendershott Rd.	Guyatt Rd.	0.1	5	Replace Culvert
-	- surface	44	Woodburn Rd.	Con. 1, Lot 7	0.6 km South of Golf Club Rd.		
-	- surface	46	Woodburn Rd.	Con. 2, Lot 8	Golf Club Rd.		
-	- surface	65	Glanbrook/Haldimand Townline	Golf Club Rd.			
-	- structural	22	West-Lincoln Townline Road	Twenty Rd.		183*	Carry Over
-	- surface	31	Guyatt Rd.	Block 4, Lot 3/		20	Carry Over
-	- surface	71	Harrison Rd.	Lot 2		35	Carry Over
-	- surface	94	Leeming Rd.	Con. 7/Con. 8		13	Carry Over
-	- surface	36	Glanbrook/Lincoln Townline	Hwy. 6		25*	Carry Over
-	- sight distance	64	Miles Rd.	Binbrook Rd.		2	Clearing
				Chippewa Rd.	Whitechurch Rd.		

* Reconst. = Complete Reconstruction , B & S = Base & Surface , Resurf. = Resurface , R & W = Resurface & Widen

NOW DEFICIENCIES

ROAD CONSTRUCTION NEEDS BY TIME PERIODS

RATING	GUIDE	TYPE OF DEFICIENCY	SECTION NUMBER	NAME / LOCATION	DESCRIPTION		IMPROV. LENGTH (in km.)	TOTAL COST (THOUS.)	TYPE OF IMPROV.
					FROM	TO			
24	13	structural	25	Hendershott Rd.	Golf Club Rd.	Hwy. 20	2.1	116	B & S
23	3	structural	96	Ferris Rd.	0.3 km South of Leeming Rd.	Chippewa Rd.	1.7	68	B & S
22	21	surface	14	Golf Club Rd.	Trinity Church	Fletchers Rd.	1.2	66	B & S
18	7	structural	52	Hall Rd.	Trinity Church	Harrison Rd.	2.2	88	B & S
15	8	surface	12	Dickenson Rd.	Nebo Rd.	0.7 km East	0.7	38	B & S
15	5	structural	37	Glanbrook/West-Lincoln Townline	Kirk Rd.	Glanbrook/Haldimand Townline	4.2	74*	B & S

Reconst. = Complete Reconstruction, B & S = Base & Surface, Resurf. = Resurface, R & W = Resurface & Widen

* Glanbrook Share of Boundary Road Costs

1 - 5 YEAR DEFICIENCIES

ROAD CONSTRUCTION NEEDS BY TIME PERIODS

RATING	GUIDE	TYPE OF DEFICIENCY	SECTION NUMBER	DESCRIPTION		IMPROV. LENGTH (in km.)	TOTAL COST (THOUS.)	TYPE OF IMPROV
				NAME / LOCATION	FROM TO			
31	7	surface structural	39	Berry Rd.	Hall Rd.	1.3	142	Reconst
29	11	structural	17	Golf Club Rd.	Hendershott Rd.	2.0	218	Reconst
28	6	structural	72	Kirk Rd. East	Hwy. 56	1.0	129	Reconst
26	5	structural	89	Chippewa Rd.	Glancaester Rd.	2.1	332	Reconst
23	14	structural	32	Guyatt Rd.	Block 4, Lot 3 / Lot 2	0.6	48	B & S
21	7	structural	20	West-Lincoln Townline Rd.	Golf Club Rd.	0.9	71*	Reconst
20	6	structural	33	Hwy. 56	Hendershott Rd.	2.0	316	Reconst
20	2	structural	9	Glanbrook-Ryckmans Corner Bdy.	0.4 km South	0.4	63	Reconst
19	11	surface structural	90	Glancaester Rd.	Whitechurch Rd.	1.3	36*	B & S
18	4	structural	7	Twenty Rd.	Miles Rd.	1.8	206	Reconst
18	4	structural	84	Tisdale Rd.	Chippewa Rd.	1.3	125	Reconst
18	3	structural	30	Cemetery Rd.	Fletcher's Rd.	2.0	196	Reconst
18	1	surface	8	Twenty Rd.	Glovers Rd.	1.1	202	Reconst
17	2	surface	10	Glovers Rd.	0.4 km North of Twenty Rd.	1.3	205	Reconst
16	4	structural	13	Dickenson Rd.	Twenty Rd.	1.1 km West of Trinity Church	120	Reconst
15	3	structural	69	Glanbrook/Haldimand Townline	Blackheath Rd.	0.6 km South of Hwy. 56	48*	Reconst

Reconst. = Complete Reconstruction, B & S = Base & Surface, Resurf. = Resurface, R & W = Resurface & Widen

* Glanbrook Share of Boundary Road Costs

6 - 10 YEAR DEFICIENCIES

ROAD CONSTRUCTION NEEDS BY TIME PERIODS

PRIORITY	TYPE OF DEFICIENCY	SECTION NUMBER	NAME / LOCATION	DESCRIPTION	IMPROV. LENGTH (in km.)	TOTAL COST (THOUS)	TYPE OF IMPROV.
RATING	GUIDE			FROM	TO		
22	11	structural	27	Trinity Church Rd.	Golf Club Rd.	1.5	Reconst
21	11	structural	28	Trinity Church Rd.	Golf Club Rd.	2.2	Reconst
18	5	structural	78	Woodburn Rd.	Hall Rd.	4.6	Reconst
17	4	surface	73	Kirk Rd. East	Trimble Rd.	2.6	Reconst
16	5	structural	34	Guyatt Rd.	Hendershott Rd.	2.0	Reconst
14	5	structural	4	Twenty Rd.	Miles Rd.	2.7	Reconst
12	3	structural	88	Chippewa Rd.	Hwy. 6	4.0	Resurf. & Widen
11	2	structural	86	Chippewa Rd.	Tyneside Rd.	2.3	Reconst
					Trinity Church	2.51	Reconst

Reconst. = Complete Reconstruction , B & S = Base & Surface , Resurf. = Resurface , R & W = Resurface & Widen

* Glanbrook Share of Boundary Road Costs

SPOT DEFICIENCIES

STRUCTURE NEEDS BY TIME PERIODS

PRIORITY RATING	STRUCTURE NUMBER	ROAD SECTION NUMBER	DESCRIPTION/LOCATION	IMPROVEMENT	COST (THOUS)	TYPE
-	2	96	Ferris Rd., Lot 8/9, Con.7		10	Guide Rail & Approaches
-	3	65	Miles Rd., Lots 10/11, Con.7		11	Replace Wingwall
-	4	74	Trimble Rd., Lots 24/25, Con.7		6	Guide Rail
-	9	37	Glanbrook/West-Lincoln Townline, Lot 33, Con.10		2	Guide Rail

RAILWAY CROSSING INVENTORY - 1981

XING NO.	ROAD SECT. NO.	ROAD DESCRIPTION / LOCATION	NO. OF TRACKS				AVERAGE TRAINS/DAY	NO. OF TRAFFIC LANES	1981 A.A.D.T.	EXPOSURE INDEX	PROTECTION			IMPROVEMENT COST (THOUSANDS)		
			MAIN	SPUR	MAIN	SPUR					EXIST	WARRANT	MUNIC	MTC	OTHERS	TOTAL
1	7	Twenty Rd., Lot 13, Con. 1 & 2	1	-	6	-	2	273	1638	Signs	Signals	3	3	40	46	
2	99	Airport Rd., Lot 11, Con. 3 & 4	1	-	6	-	2	750	4500	Signals	Signals	-	-	-	-	
3	64	Miles Rd., Con. 6, Lots 10 & 11	1	1	6	-	2	130	780	Signs	Signs	1	1	-	2	
4	88	Chippewa Rd.	1	1	6	-	2	364	2184	Signs	Signals	3	3	40	46	
5	55	Glanbrook/Haldimand Townline	1	-	6	-	2	160	960	Signs	Signs	-	-	-	-	

Appendix D

Sample Inventory Sheets

SAMPLE INVENTORY SHEETS

MUNICIPAL ROAD SECTION - APPRAISAL SHEET											
CONTROL 81-6101		[3-6-127]		[3-6-127]		[3-6-127]		[3-6-127]		[3-6-127]	
① UPDATE CODE											
IDENTIFICATION		Golf Club Rd.		⑦ Munic-Twp. of Glensbrook							
② ROAD DESIGN & PROPERTY OWNERSHIP		CRANE RD.		④ SECTION NO.		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]	
③ FLETCHERS RD. (R.R. RD. 640)		⑤ LENGTH		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]	
6 SPARE		⑥ POSSIBLY ENVIRON. WELLS - NO.		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]	
⑦ ADJAC. MUNIC. - RAILROAD SECTION NO. [] [] []		⑧ ROADSIDE FEATURES URBAN (URBAN) []		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]	
⑨ STRUCTURE NO.		⑩ ROADWAY WIDTH - NO.		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]	
⑩ SPARE		⑪ PRIVATE JAMES ATCH 1 CO LOC 121		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]	
⑪ SPARE		⑫ DESIRABLE JUMPS CO LOC 121		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]	
⑫ SPARE		⑬ PRIVATE JAMES SUB NO 113 MTC 121		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]	
⑭ SPARE		⑮ SPARE COMPANY NAME		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]		[1-0-0-1-0-0]	
EASING CONDITIONS & ADJACENCY RESTRICTIONS											
20 EASING CONDITION - NO.		21 PLATFORM WIDTH - NO.		22 SURFACE TYPE - NO.		23 SURFACE TYPE - NO.		24 SURFACE TYPE - NO.		25 SURFACE TYPE - NO.	
21 AVE SAFE SPEED - NO.		20 width - NO.		22 SUGARLOAF WIDTH - NO.		23 LUBRICATE WIDTH - NO.		24 STONE WIDTH - NO.		25 GROUT WIDTH - NO.	
22 SPARE		20 width - NO.		22 SUGARLOAF WIDTH - NO.		23 LUBRICATE WIDTH - NO.		24 STONE WIDTH - NO.		25 GROUT WIDTH - NO.	
23 HORIZ ALIGN NO. OF SUBSTANDARD CURVES - NO.		24 VERT ALIGN NO. OF SUBSTANDARD CURVES - NO.		25 HORIZ ALIGN NO. OF SUBSTANDARD GRADIENTS - NO.		26 BOUNDARY WIDTH - NO.		27 Curb/Traffic Barrier - NO.		28 MOUNTAINABLE - NO.	
26 PARKING LEFT RESTRICTED YES - NO		27 RESTRICTIONS - NO.		28 SPARE		29 SPARE		30 SPARE		31 SPARE	
29 SPARE		30 RESTRICTED TO THE SPARE		31 SPARE		32 SPARE		33 SPARE		34 SPARE	
POINT RESTRICTIONS											
35 SPARE		36 SPARE		37 SPARE		38 SPARE		39 SPARE		40 SPARE	
POINT RATINGS											
41 SPARE		42 SPARE		43 SPARE		44 SPARE		45 SPARE		46 SPARE	
47 SPARE		48 SPARE		49 SPARE		50 SPARE		51 SPARE		52 SPARE	
DEFICIENCIES											
53 SPARE		54 SPARE		55 SPARE		56 SPARE		57 SPARE		58 SPARE	
59 SPARE		60 SPARE		61 SPARE		62 SPARE		63 SPARE		64 SPARE	
65 SPARE		66 SPARE		67 SPARE		68 SPARE		69 SPARE		70 SPARE	
71 SPARE		72 SPARE		73 SPARE		74 SPARE		75 SPARE		76 SPARE	
POINT COST & TIME OF IMPROVEMENT											
77 SPARE		78 SPARE		79 SPARE		80 SPARE		81 SPARE		82 SPARE	
83 SPARE		84 SPARE		85 SPARE		86 SPARE		87 SPARE		88 SPARE	
89 SPARE		90 SPARE		91 SPARE		92 SPARE		93 SPARE		94 SPARE	
95 SPARE		96 SPARE		97 SPARE		98 SPARE		99 SPARE		100 SPARE	
COSTS IN \$											
101 SPARE		102 SPARE		103 SPARE		104 SPARE		105 SPARE		106 SPARE	
107 SPARE		108 SPARE		109 SPARE		110 SPARE		111 SPARE		112 SPARE	
113 SPARE		114 SPARE		115 SPARE		116 SPARE		117 SPARE		118 SPARE	
119 SPARE		120 SPARE		121 SPARE		122 SPARE		123 SPARE		124 SPARE	
125 SPARE		126 SPARE		127 SPARE		128 SPARE		129 SPARE		130 SPARE	
INSURANCE											
131 SPARE		132 SPARE		133 SPARE		134 SPARE		135 SPARE		136 SPARE	
137 SPARE		138 SPARE		139 SPARE		140 SPARE		141 SPARE		142 SPARE	
143 SPARE		144 SPARE		145 SPARE		146 SPARE		147 SPARE		148 SPARE	
149 SPARE		150 SPARE		151 SPARE		152 SPARE		153 SPARE		154 SPARE	
COSTS OF WAY											
155 SPARE		156 SPARE		157 SPARE		158 SPARE		159 SPARE		160 SPARE	
161 SPARE		162 SPARE		163 SPARE		164 SPARE		165 SPARE		166 SPARE	
167 SPARE		168 SPARE		169 SPARE		170 SPARE		171 SPARE		172 SPARE	
173 SPARE		174 SPARE		175 SPARE		176 SPARE		177 SPARE		178 SPARE	
COSTS OF STORM SEWER											
179 SPARE		180 SPARE		181 SPARE		182 SPARE		183 SPARE		184 SPARE	
185 SPARE		186 SPARE		187 SPARE		188 SPARE		189 SPARE		190 SPARE	
191 SPARE		192 SPARE		193 SPARE		194 SPARE		195 SPARE		196 SPARE	
197 SPARE		198 SPARE		199 SPARE		200 SPARE		201 SPARE		202 SPARE	
COSTS OF SIDEWALK											
203 SPARE		204 SPARE		205 SPARE		206 SPARE		207 SPARE		208 SPARE	
209 SPARE		210 SPARE		211 SPARE		212 SPARE		213 SPARE		214 SPARE	
215 SPARE		216 SPARE		217 SPARE		218 SPARE		219 SPARE		220 SPARE	
221 SPARE		222 SPARE		223 SPARE		224 SPARE		225 SPARE		226 SPARE	
COSTS OF OTHER											
227 SPARE		228 SPARE		229 SPARE		230 SPARE		231 SPARE		232 SPARE	
233 SPARE		234 SPARE		235 SPARE		236 SPARE		237 SPARE		238 SPARE	
239 SPARE		240 SPARE		241 SPARE		242 SPARE		243 SPARE		244 SPARE	
245 SPARE		246 SPARE		247 SPARE		248 SPARE		249 SPARE		250 SPARE	
COSTS OF TOTAL COST											
251 SPARE		252 SPARE		253 SPARE		254 SPARE		255 SPARE		256 SPARE	
257 SPARE		258 SPARE		259 SPARE		260 SPARE		261 SPARE		262 SPARE	
263 SPARE		264 SPARE		265 SPARE		266 SPARE		267 SPARE		268 SPARE	
269 SPARE		270 SPARE		271 SPARE		272 SPARE		273 SPARE		274 SPARE	
COSTS OF SUBGRADE COST											
275 SPARE		276 SPARE		277 SPARE		278 SPARE		279 SPARE		280 SPARE	
281 SPARE		282 SPARE		283 SPARE		284 SPARE		285 SPARE		286 SPARE	
287 SPARE		288 SPARE		289 SPARE		290 SPARE		291 SPARE		292 SPARE	
293 SPARE		294 SPARE		295 SPARE		296 SPARE		297 SPARE		298 SPARE	
COSTS OF DRIBBLE/ABNDS. & JUNCT.											
299 SPARE		300 SPARE		301 SPARE		302 SPARE		303 SPARE		304 SPARE	
305 SPARE		306 SPARE		307 SPARE		308 SPARE		309 SPARE		310 SPARE	
311 SPARE		312 SPARE		313 SPARE		314 SPARE		315 SPARE		316 SPARE	
317 SPARE		318 SPARE		319 SPARE		320 SPARE		321 SPARE		322 SPARE	
COSTS OF REINFORCER.											
323 SPARE		324 SPARE		325 SPARE		326 SPARE		327 SPARE		328 SPARE	
329 SPARE		330 SPARE		331 SPARE		332 SPARE		333 SPARE		334 SPARE	
335 SPARE		336 SPARE		337 SPARE		338 SPARE		339 SPARE		340 SPARE	
341 SPARE		342 SPARE		343 SPARE		344 SPARE		345 SPARE		346 SPARE	
COSTS OF K. N. CONSTRUCTION											
347 SPARE		348 SPARE		349 SPARE		350 SPARE		351 SPARE		352 SPARE	
353 SPARE		354 SPARE		355 SPARE		356 SPARE		357 SPARE		358 SPARE	
359 SPARE		360 SPARE		361 SPARE		362 SPARE		363 SPARE		364 SPARE	
365 SPARE		366 SPARE		367 SPARE		368 SPARE		369 SPARE		370 SPARE	
COSTS OF APPROXIMATE LENGTH											
371 SPARE		372 SPARE		373 SPARE		374 SPARE		375 SPARE		376 SPARE	
377 SPARE		378 SPARE		379 SPARE		380 SPARE		381 SPARE		382 SPARE	
383 SPARE		384 SPARE		385 SPARE		386 SPARE		387 SPARE		388 SPARE	
389 SPARE		390 SPARE		391 SPARE		392 SPARE		393 SPARE		394 SPARE	
395 SPARE		396 SPARE		397 SPARE		398 SPARE		399 SPARE		400 SPARE	
COSTS OF APPROXIMATE LENGTH											
401 SPARE		402 SPARE		403 SPARE		404 SPARE		405 SPARE		406 SPARE	
407 SPARE		408 SPARE		409 SPARE		410 SPARE		411 SPARE		412 SPARE	
413 SPARE		414 SPARE		415 SPARE		416 SPARE		417 SPARE		418 SPARE	
419 SPARE		420 SPARE		421 SPARE		422 SPARE		423 SPARE		424 SPARE	
425 SPARE		426 SPARE		427 SPARE		428 SPARE		429 SPARE		430 SPARE	
COSTS OF APPROXIMATE LENGTH											
431 SPARE		432 SPARE		433 SPARE		434 SPARE		435 SPARE		436 SPARE	
437 SPARE		438 SPARE		439 SPARE		440 SPARE		441 SPARE		442 SPARE	
443 SPARE		444 SPARE		445 SPARE		446 SPARE		447 SPARE		448 SPARE	
449 SPARE		450 SPARE		451 SPARE		452 SPARE		453 SPARE		454 SPARE	
COSTS OF APPROXIMATE LENGTH											
455 SPARE		456 SPARE		457 SPARE		458 SPARE		459 SPARE		460 SPARE	
461 SPARE		462 SPARE		463 SPARE		464 SPARE		465 SPARE		466 SPARE	
467 SPARE		468 SPARE		469 SPARE		470 SPARE		471 SPARE		472 SPARE	
473 SPARE		474 SPARE		475 SPARE		476 SPARE		477 SPARE		478 SPARE	
COSTS OF APPROXIMATE LENGTH											
479 SPARE		480 SPARE		481 SPARE		482 SPARE		483 SPARE		484 SPARE	
485 SPARE		486 SPARE		487 SPARE		488 SPARE		489 SPARE		490 SPARE	
491 SPARE		492 SPARE		493 SPARE		494 SPARE		495 SPARE		496 SPARE	
497 SPARE		498 SPARE		499 SPARE		500 SPARE		501 SPARE		502 SPARE	
COSTS OF APPROXIMATE LENGTH											
503 SPARE		504 SPARE		505 SPARE		506 SPARE		507 SPARE		508 SPARE	
509 SPARE		510 SPARE		511 SPARE		512 SPARE		513 SPARE		514 SPARE	
515 SPARE		516 SPARE		517 SPARE		518 SPARE		519 SPARE		520 SPARE	
521 SPARE		522 SPARE		523 SPARE		524 SPARE		525 SPARE		526 SPARE	
COSTS OF APPROXIMATE LENGTH											
527 SPARE		528 SPARE		529 SPARE		530 SPARE		531 SPARE		532 SPARE	
533 SPARE		534 SPARE		535 SPARE		536 SPARE		537 SPARE		538 SPARE	
539 SPARE		540 SPARE		541 SPARE		542 SPARE		543 SPARE		544 SPARE	
545 SPARE		546 SPARE		547 SPARE		548 SPARE		549 SPARE		550 SPARE	
COSTS OF APPROXIMATE LENGTH											
551 SPARE		552 SPARE		553 SPARE		554 SPARE		555 SPARE		556 SPARE	
557 SPARE		558 SPARE		559 SPARE		560 SPARE		561 SPARE		562 SPARE	
563 SPARE		564 SPARE		565 SPARE		566 SPARE		567 SPARE		568 SPARE	
569 SPARE		570 SPARE		571 SPARE		572 SPARE		573 SPARE		574 SPARE	
COSTS OF APPROXIMATE LENGTH											
575 SPARE		576 SPARE		577 SPARE		578 SPARE		579 SPARE		580 SPARE	
581 SPARE		582 SPARE		583 SPARE		584 SPARE		585 SPARE		586 SPARE	
587 SPARE		588 SPARE		589 SPARE		590 SPARE		591 SPARE		592 SPARE	
593 SPARE		594 SPARE		595 SPARE		596 SPARE		597 SPARE		598 SPARE	
COSTS OF APPROXIMATE LENGTH											
599 SPARE		600 SPARE		601 SPARE		602 SPARE		603 SPARE		604 SPARE	
605 SPARE		606 SPARE		607 SPARE		608 SPARE		609 SPARE		610 SPARE	
COSTS OF APPROXIMATE LENGTH											
611 SPARE		612 SPARE		613 SPARE		614 SPARE		615 SPARE		616 SPARE	
617 SPARE		618 SPARE		619 SPARE		620 SPARE		621 SPARE		622 SPARE	
623 SPARE		624 SPARE		625 SPARE		626 SPARE		627 SPARE		628 SPARE	
629 SPARE		630 SPARE		631 SPARE		632 SPARE		633 SPARE		634 SPARE	
COSTS OF APPROXIMATE LENGTH											
635 SPARE		636 SPARE		637 SPARE		638 SPARE		639 SPARE		640 SPARE	
641 SPARE		642 SPARE		643 SPARE		644 SPARE		645 SPARE		646 SPARE	
647 SPARE		648 SPARE		649 SPARE		650 SPARE		651 SPARE		652 SPARE	
653 SPARE		654 SPARE		655 SPARE		656 SPARE		657 SPARE		658 SPARE	
COSTS OF APPROXIMATE LENGTH											
659 SPARE		660 SPARE		661 SPARE		662 SPARE		663 SPARE		664 SPARE	
665 SPARE		666 SPARE		667 SPARE		668 SPARE		669 SPARE		670 SPARE	
671 SPARE		672 SPARE		673 SPARE		674 SPARE		675 SPARE		676 SPARE	
677 SPARE		678 SPARE		679 SPARE		680 SPARE		681 SPARE		682 SPARE	
COSTS OF APPROXIMATE LENGTH											
683 SPARE		684 SPARE		685 SPARE		686 SPARE		687 SPARE		688 SPARE	
689 SPARE		690 SPARE		691 SPARE		692 SPARE		693 SPARE		694 SPARE	
695 SPARE		696 SPARE		697 SPARE		698 SPARE		699 SPARE		700 SPARE	
COSTS OF APPROXIMATE LENGTH											
701 SPARE		702 SPARE		703 SPARE		704 SPARE		705 SPARE		706 SPARE	
707 SPARE		708 SPARE		709 SPARE		710 SPARE		711 SPARE		712 SPARE	
713 SPARE		714 SPARE		715 SPARE		716 SPARE		717 SPARE		718 SPARE	
719 SPARE		720 SPARE		721 SPARE		722 SPARE		723 SPARE		724 SPARE	
COSTS OF APPROXIMATE LENGTH											
725 SPARE		726 SPARE		727 SPARE		728 SPARE		729 SPARE		730 SPARE	
731 SPARE		732 SPARE		733 SPARE		734 SPARE		735 SPARE		736 SPARE	
737 SPARE		738 SPARE		739 SPARE		740 SPARE		741 SPARE		742 SPARE	
743 SPARE											

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